

Report Date: 30 Jun 2014

Summary Report for Individual Task
551-88L-3072
Troubleshoot a Sanitation System
Status: Approved

Distribution Restriction: Approved for public release; distribution is unlimited.

Destruction Notice: None

Foreign Disclosure: FD5 - This product/publication has been reviewed by the product developers in coordination with the [installation/activity name] foreign disclosure authority. This product is releasable to students from all requesting foreign countries without restrictions.

Condition: Given a sanitation system aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, while wearing appropriate PPE, (i.e. hearing protection, Nitrile gloves, eye protection, etc.), lock out tag out kit and a marine rail tool box.

Standard: The Soldier correctly troubleshoots a sanitation system aboard an Army vessel, IAW the appropriate Technical Manual and local SOPs, without injury to self or others and without damage to equipment.

Special Condition: None

Safety Risk: High

MOPP 4:

Task Statements

Cue: None

DANGER

None

WARNING

None

CAUTION

None

Remarks: None

Notes: None

Performance Steps

1. Troubleshoot a sanitation system using unit maintenance troubleshooting procedures.

Note: Each country has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from baselines determined in accordance with the United Nations Convention on the Law of the Sea.

WARNING

No smoking or eating while working on a marine sanitation device.

CAUTION

Do not perform maintenance on a Marine Sanitation Device if there is poor air circulation.

- a. High level status light stays illuminated continuously and MSD shuts down.

- (1) Plugged screen and/or defective impact sprinkler/backwash nozzle.

- (2) Plugged discharge line or discharge line valve is in closed position.

- (3) High level electrode is shorted.

- (4) Flow pump operating at reduced capacity.

- (5) Excessive demand on system.

- (6) Commode stuck in flush mode.

- (7) Improper transfer pump flow rate.

- (a) Remove and clean screen and/or replace impact sprinkler/backwash nozzle.

- (b) Clear overboard discharge line or open discharge line valve.

- (c) Remove level sensor assembly. Check for continuity between leads of electrodes in level sensor assembly. Each lead should be isolated.

- (d) Inspect and test

- (e) Change MSD Selector Switch from AUTO to CONT until demand is reduced.

- (f) Check commodes for over usage or stuck flush valve, repair as required.

- (g) Change transfer pump to a lower flow rate.

- b. BACKWASH status light stays illuminated continuously and system shuts down.

- (1) No backwash water being supplied to the unit (proper reading on the backwash gauge).

- (2) Lack of backwash water pressure.

(3) Defective impact sprinkler/backwash nozzle.

(4) Check for loose connection or broken wiring to the backwash solenoid valve.

(5) Defective backwash solenoid valve.

(6) Defective backwash pressure switch.

(7) Gate valve closed.

(a) Check to see if auxiliary seawater pump is on line and properly aligned. Start auxiliary seawater pump and verify proper alignment.

(b) Verify that water is being supplied to MSD. Check/clean backwash supply strainer.

(c) Replace impact sprinkler/backwash nozzle

(d) Check connection and wiring to the solenoid valve and correct as necessary

(e) Replace backwash solenoid valve

(f) Replace backwash pressure switch

(g) Open gate valve.

Note: System shall continuously be checked for leaks. If leaks exist, shutdown system (if not automatically shutdown), place circuit breaker to "OFF." Replace and/or repair PVC piping, joints, hoses, etc., to return the system to a leak proof condition.

c. MACERATOR and FLOW PUMP status light stays illuminated continuously.

(1) Macerator motor hums, but macerator does not operate.

(2) Flow pump malfunction, impeller, bearings, plugged inlet, broken mount or bent shaft.

(a) Jammed grind element. Clear jam.

(b) Remove and repair flow pump. Disassemble and replace defective component(s).

d. POWER ON light does not illuminate when POWER DISCONNECT SWITCH is placed to ON and LOW VOLTAGE RESET push button is pressed. All other status lights do not illuminate.

(1) MSD power source is not available.

(2) MSD Circuit breaker tripped.

(3) Defective MSD circuit breaker, or loose connections.

(4) Defective microprocessor or POWER ON light (LED).

(a) Verify circuit breaker is on, if circuit breaker is on and MSD power is still not available, troubleshoot power source.

- (b) Reset MSD circuit breaker.
 - (c) Tighten loose connections or replace MSD circuit breaker if required.
 - (d) Replace/repair microprocessor.
- e. Device operates properly in AUTO mode but does not operate when MODE switch is placed in CONT position.
- (1) Defective MODE switch.
 - (2) Loose connections.
 - (a) Replace MODE switch
 - (b) Check and tighten loose connections
- f. Device operates properly in CONT mode but does not operate when MODE switch is placed in AUTO position.
- (1) Faulty or malfunctioning level sensor assembly.
 - (2) Defective MODE switch.
 - (3) Loose connections.
 - (4) Defective microprocessor.
 - (a) Conduct level sensor assembly test
 - (b) Replace MODE switch
 - (c) Check and tighten loose connections
 - (d) Check wiring connections. Replace/repair microprocessor
- g. Any status indicator fault light stays illuminated continuously and system does not shutdown.
- (1) Defective microprocessor.
 - (2) Defective motor contactor.
 - (3) Defective relay board.
 - (a) Check wiring connections. Replace/repair microprocessor.
 - (b) Replace/repair contactor.
 - (c) Replace/repair relay board.
- h. No bleach being supplied to the treatment tank.

WARNING

CHEMICAL HAZARD. Personal protective equipment (PPE) must be worn to avoid contact with skin and splashing in eyes. Avoid prolonged breathing of fumes.

- (1) Check to see if there is no bleach in tank.
- (2) Check to see if metering valve is closed.
- (3) Check for restricted supply.
- (4) Check to see if metering solenoid valve is defective.
 - (a) Add bleach and check bleach tank for leaks. Replace tank if necessary.
 - (b) Open metering valve by turning counterclockwise.
 - (c) Check line for restriction and clear as necessary.
 - (d) Replace metering solenoid valve.

2. Troubleshoot a sanitation system using intermediate direct support troubleshooting procedures.

a. A pump status light constantly illuminated, Power On light is illuminated, system not operating in AUTO mode.

- (1) Check for pump motor failure due to low current (winding separation), or high current (motor overload tripped).
- (2) If symptom still exists, replace the capacitor or the motor on the macerator.

b. Unit stops or fails to run.

- (1) Defective capacitor on the macerator.
- (2) Replace faulty capacitor on the macerator as required by test.

c. Macerator operation noisy or vibrates excessively.

- (1) Check for debris trapped in macerator.
- (2) Check for broken rotor shredder.
- (3) Check for defective motor bearings.
 - (a) Remove macerator and clear debris.
 - (b) Replace the macerator rotor shredder.
 - (c) Replace the macerator bearing.

d. Large amounts of oil or grease on motor surfaces.

(1) Check for overheating due to motor binding.

(2) On macerator motor, replace the bearing or motor as required.

e. Marine Sanitation Device working but processes slowly

(1) Check rotor shredder for wear or damage.

(2) Replace the rotor shredder.

3. Troubleshoot a Red Fox "Fox Pac" Type II MSD Sanitation Device.

a. Bad odor, water in aeration tank black.

(1) Not enough air/check air supply.

(2) Toxic cleaning products/discontinue use.

b. Effluent very dirty, visible solids in liquid.

(1) Biological filter washout/flush out filter.

(2) Excessive sewage flow through unit/ check for stuck flush valves, etc.

(3) Not enough air/check air supply.

c. Not enough chlorine residual (Should be at least .05 mg/1).

(1) Line or valve clogged/remove and clean.

(2) Needle valve not open enough/open more.

SUMMARY OF U.S. ARMY DISCHARGE RESTRICTIONS

	U.S. Navigable Waters & Territorial Seas (0-3 nm)	Contiguous Zone (3-12 nm)	12-25 nm	> 25 nm
Sewage	No discharge.	Army Watercraft may discharge sewage directly overboard. Vessels equipped with a USCG-approved Type I or II MSD shall treat the sewage prior to discharge.	Army Watercraft may discharge sewage directly overboard. Vessels equipped with a USCG-approved Type I or II MSD shall treat the sewage prior to discharge.	Army Watercraft may discharge sewage directly overboard. Vessels equipped with a USCG-approved Type I or II MSD shall treat the sewage prior to discharge.
Graywater	Army Watercraft shall collect graywater in installed MSDs or graywater collection systems. If no collection capability exists, vessels may discharge graywater directly overboard unless prohibited by State and/or Local requirements.	Army Watercraft may discharge graywater directly overboard.	Army Watercraft may discharge graywater directly overboard.	Army Watercraft may discharge graywater directly overboard.
Oily Waste	No sheen. Oil content of effluent without dilution must be less than 15 ppm.	No sheen. Oil content of effluent without dilution must be less than 15 ppm.	No sheen. Oil content of effluent without dilution must be less than 100 ppm.	No sheen. Oil content of effluent without dilution must be less than 100 ppm.
Garbage (Non-plastic)	No discharge.	Discharge of victual wastes and all other garbage including paper products, rags, glass, metal, bottles, crockery and similar refuse after it has been passed through a grinder or comminuter capable of processing garbage so that it passes through a screen with openings no greater than 25 millimeters (one inch) is permitted.	Discharge of victual wastes and all other garbage including paper products, rags, glass, metal, bottles, crockery and similar refuse is permitted.	Discharge of dunnage, lining and packing materials that float is permitted.
Garbage (Plastics)	No discharge.	No discharge.	No discharge.	No discharge.
Hazardous Substances	No discharge.	No discharge.	No discharge.	No discharge.
Medical Wastes	No discharge.	No discharge.	No discharge.	No discharge.

SUMMARY OF U.S. ARMY DISCHARGE RESTRICTIONS

Figure 551-88L-3072_01

(Asterisks indicates a leader performance step.)

Evaluation Guidance: None

Evaluation Preparation: None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Troubleshooting a sanitation system using unit maintenance troubleshooting procedures.			
a. High level status light stays illuminated continuously and MSD shuts down.			
b. BACKWASH status light stays illuminated continuously and system shuts down.			
c. MACERATOR and FLOW PUMP status light stays illuminated continuously.			
d. POWER ON light does not illuminate when POWER DISCONNECT SWITCH is placed to ON and LOW VOLTAGE RESET push button is pressed.			
e. Device operates properly in AUTO mode but does not operate when MODE switch is placed in CONT position.			
f. Device operates properly in CONT mode but does not operate when MODE switch is placed in AUTO position.			
g. Any status indicator fault light stays illuminated continuously and system does not shutdown.			
h. No bleach being supplied to the treatment tank.			
2. Troubleshooting a sanitation system using intermediate direct support troubleshooting procedures.			
a. A pump status light constantly illuminated, Power On light is illuminated, system not operating in AUTO mode.			
b. Unit stops or fails to run.			
c. Macerator operation noisy or vibrates excessively.			
d. Large amounts of oil or grease on motor surfaces.			
e. Marine Sanitation Device working but processes slowly.			
3. Troubleshooting a Red Fox "Fox Pac" Type II MSD Sanitation Device.			
a. Bad odor, water in aeration tank black.			
b. Effluent very dirty, visible solids in liquid.			
c. Not enough chlorine.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	TM 55-1905-223-24-11	UNIT, INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE INSTRUCTIONS MARINE SANITATION DEVICE (MSD) FOR LANDING CRAFT UTILITY (LCU) (NSN 1905-01-154-1191)	No	No
	TM 55-1915-214-24&P	UNIT, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR MARINE SANITATION PLANT P/N RF-1500-FP-CBPN-D 0	No	No

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and

water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks : None

ICTL Data :

ICTL Title	Personnel Type	MOS Data
88L30 Watercraft Engineer	Enlisted	MOS: 88L, Skill Level: SL3, Duty Pos: TFR, LIC: EN
88L40 Watercraft Engineer	Enlisted	MOS: 88L, Skill Level: SL4, Duty Pos: TGB, LIC: EN, SQI: O